Autonomic Link Optimization Through Elimination of Unnecessary Transfers

ABSTRACT

5   Disclosed are a system, a method, and a computer program product to efficiently create consistent transaction sets to maintain one or more copies of data at different data storage sites. All transactions sent to a primary backup appliance during a consistent transaction set creation interval are formed into a consistent transaction set by efficiently adding new transactions as they are received and removing unnecessary transfers as newer versions arrive. When the creation

10   interval has expired, the complete consistent transaction set is transferred to a secondary backup appliance to be used to update a consistent backup copy of the primary site data. For each consistent transaction set, there will be a tree data structure (a search tree) created that contains the addressing information for all of the blocks of data in the consistent transaction set. The tree data structure used is a modified splay tree, which is a specialization of a binary search tree such

15   that accessed nodes are "percolated" to the top of the tree for faster subsequent access. Secondary data consistency is maintained because the consistent transaction sets are applied whole at the secondary site, and after application, the secondary volumes are exact copies of the primary volumes at the time the consistent transaction set was completed.

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